DOCUMENT RESUME

ED 042 241 EA 002 992

AUTHOR Keepes, Bruce D.
TITLE Fiscal Effects of Public School Finance Plans.
PUB DATE 3 Mar 70
NOTE 17p.; Paper presented at American Educational Research Association Annual Meeting, (Minneapolis, Minnesota, March 2-6, 1970)

EDRS PRICE EDRS Price MF-$0.25 HC-$0.95
DESCRIPTORS *Educational Finance, School Support, *State Aid, Tax Allocation, *Taxes, Tax Rates, Tax Support

ABSTRACT

Two major issues in public school finance are fund raising and fund distributing. In this paper, four school support plans are analyzed for their effects on the distribution of funds among local districts, on the distribution of the tax burden among local, State, and national bases, and on the provisions for districts to raise or lower taxes. Plans one and two both equalize the educational services of all districts in a State at some level. Under plan one the State provides all funds for educational services. Under plan two the State adds to funds raised locally up to the point of equalization. Plan three calls for States to provide matching grants to locally raised revenue. Under plan four local districts set the level of educational service, and States subsidize some portion of the total expenditure. (RA)

ED042241

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

FISCAL EFFECTS OF PUBLIC SCHOOL FINANCE PLANS

by

Bruce D. Keepes

Two major issues in public school finance are how shall the funds be raised and how shall they be distributed. Much has been written on these two topics. There is a large body of knowledge on taxation and tax burden. Likewise the fiscal effects of various distributional schemes has been thoroughly explored. However, almost without exception, these two topics are treated separately. In a closed monitary system such as ours, where expenditures must be balanced by income[1], these two factors are intimately related. This paper presents a way of viewing the relationships between these two factors, the distribution of funds and the raising of income. These relationships are particularly important where funds are derived from sources at three levels of government: local, state, and federal.

The analysis presented in this paper identifies how each of the various school support plans[2] (a) redistributes funds among local school districts, (b) shifts the tax burden between local, state, and national tax bases, and (c) provides incentives or deterrents for school districts to raise taxes. The analysis makes use of a "money-flow model" which considers the total flow of money -- balancing revenues and expenditures. This model is in contrast to a "distributional model" that considers only the distribution of funds.

---

[1] Deficit financing, such as is being practiced by our Federal Government, is ruled out as a viable alternative for continued financing.

[2] A school finance plan is defined as one of the several methods of distribution (such as basic apportionment, school lunch program fund, etc.) which go to make up the public school finance program of a state.

EA 002 992

POOR ORIGINAL COPY - BEST AVAILABLE AT TIME FILMED

The "distributional model" forms the basis for most of the present written analyses of public school finance plans. The difference between these two models is shown on the diagram on page 3.

An essential concept in the analyses is that, with the exception of endowment funds which account for only a small percentage of total school funds, state funds for schools are derived from sales, income and other tax sources collected into the central treasury from people who reside in local school districts.[3] Therefore, state grants may be viewed as redistributions of funds, derived from taxes levied on localities by the state, among the various school districts within the state.

This concept exposes the distinction between the apparent and the true subsidy received by a local school district. The apparent subsidy is the gross payment a local school district receives from the state under the finance plan. The true subsidy is the difference between the apparent subsidy and the amount of money raised in that district by state taxes for schools. While the apparent subsidy is always positive, or at least zero, the true subsidy actually may be negative. More money is raised in state taxes in a given district than is returned to that district through state grants for the support of schools.

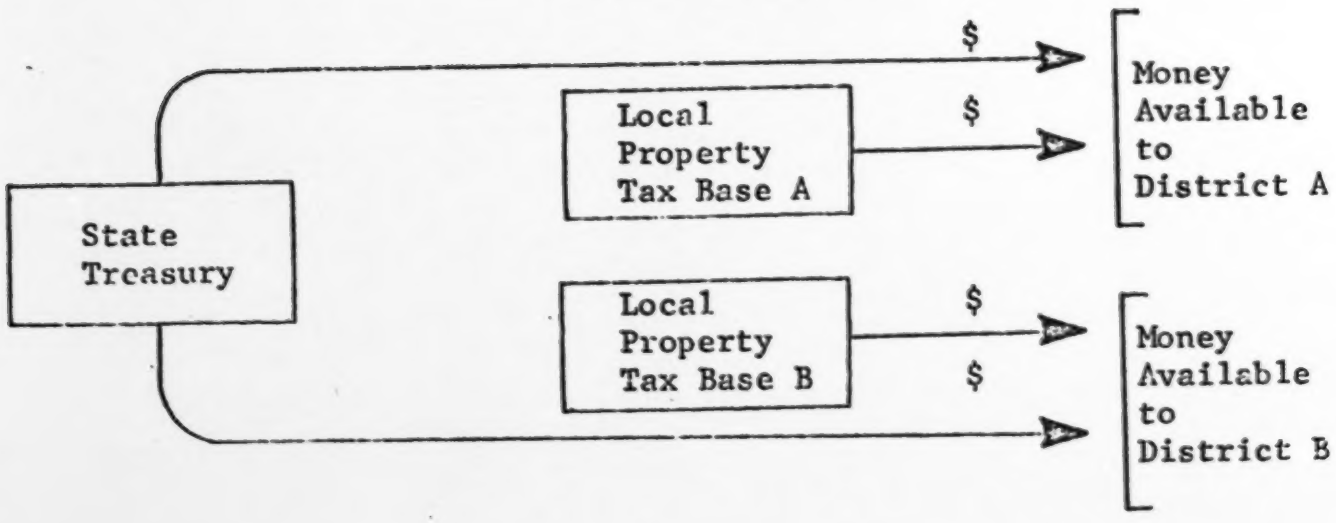
Any given school district has a limited amount of resources. If state taxes are levied, some district resources are withdrawn, leaving a lesser amount of resources to be called upon by local agencies. Since state levies are on a different set of tax bases than local school district levies, a state tax which raises a certain amount of money, for example $1,000,000, may withdraw significantly more resources from a given school district than if $1,000,000 were raised through uniform local taxes. The effect of this resource withdrawal

---

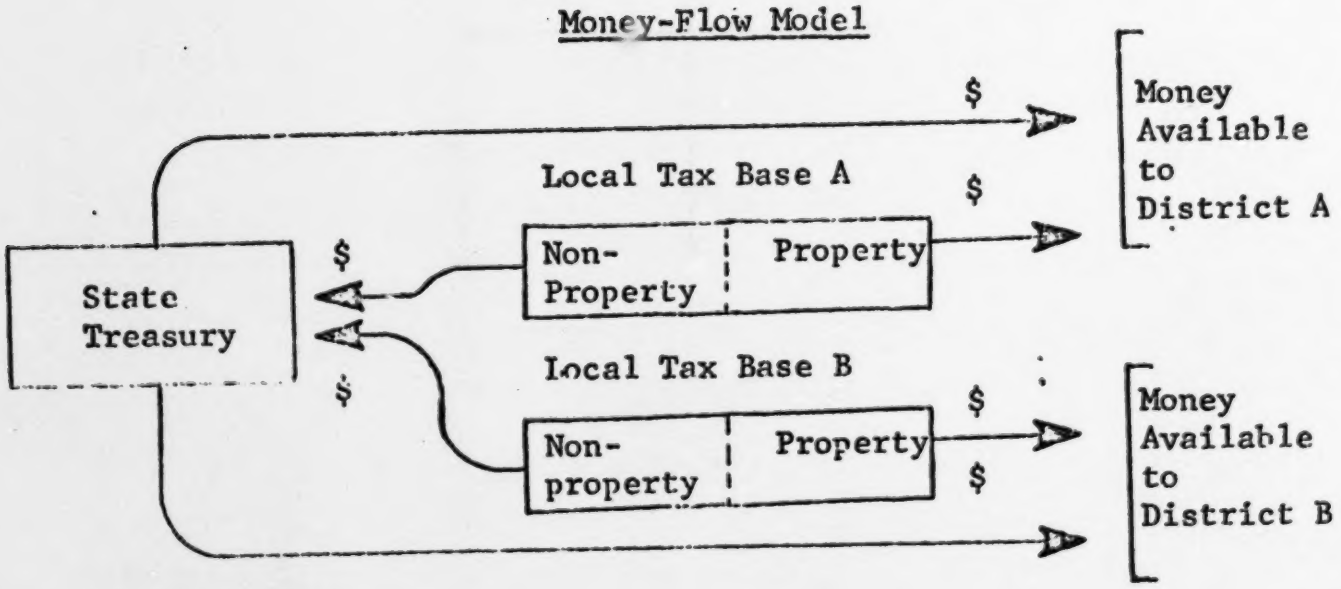
[3] A similar analysis may be used to examine the fiscal effects of federal funds.

POOR ORIGINAL COPY - BEST AVAILABLE AT TIME FILM

Distribution Model



Money-Flow Model



The above models, and simultaneous equations presented later in this paper, evolved from a study of a presentation by Richard A. Musgrave entitled "Approaches to a Fiscal Theory of Political Federalism" at the Conference of the Universities -- National Bureau Committee for Economic Research. The conference proceedings were published by Princeton University Press in 1961.

in the given school district may be such that district resources are depleted to the point where there is a negative effect on the ability of the local school district to raise taxes. Meanwhile the burden on other districts may not be excessive under the state sales tax. This interaction between state and local tax burdens on individual school districts may be analyzed using the method developed in this paper. This method involves the use of a series of simultaneous equations. Through these equations each type of state grant is defined, and redistribution of funds among districts, shifts in tax burden from local to statewide bases, and incentives and deterrents on taxation are examined.

Four simplifying assumptions are made for purposes of this analysis:

1. All funds for the support of schools are raised by state and local taxes. Income equals expenditures; the budget is balanced.

2. All funds for the support of education in a given state are administered through one finance plan. Local funds raised in excess of funds in the plans are not considered.

3. Local taxes are levied on a single tax base, referred to as the district's tax base for local taxes.

4. State taxes are levied on a single uniform base in each district, referred to as the district's tax base for state taxes.

The following symbols are used in the development of the plans:

n = number of local school districts in the state

S_i = true subsidy (+ or -) received by ith district (incoming state apportionments less state taxes collected in that district)

A_i = total outlay by the ith district, in dollars

P_i = level of performance, or service, per unit of need in

the ith district--the district has freedom to set this level

P_c = centrally set level of performance, or service, per unit of need

N_i = measure of need in the ith district

t_i = locally determined tax rate of the ith district (applied to the tax base for local taxes)

t_c = tax rate of state government required to clear the state budget (applied to the tax base for state taxes)

t_s = state mandated tax rate (applied to the district's tax base for local taxes)

B_i = tax base for state taxes of ith district

C_i = tax base for local taxes of ith district

C_s = state guaranteed tax base per unit of need for local taxes

k = matching index

The use of bars indicates averages, i.e., $\overline{B}$ = average tax base for local taxes.

Plan 1 -- Equalization of Service Level per Unit of Need

This plan encompasses the so-called flat grant. It equalizes service levels[4] per unit of need to some centrally set level, regardless of the capacity of districts to raise funds locally.

When expressed in services, the service levels may not,

4. Service level may be expressed in dollars, or may be expressed in terms such as "one teacher for twenty-five students where the dollar value is the amount for teachers' salaries based on a state salary scale".

in fact, be equalized since the same service level may cost different amounts in different districts. Uniform state taxes are levied in each district. The funds from these taxes are redistributed to local districts so that each district has sufficient money to provide the same service level per unit of need. Local levies do not form a part of this plan. Two sets of equations apply

$$(1\text{-}1) \qquad A_i = P_c N_i \qquad i = 1, 2, \ldots n;$$

$$(1\text{-}2) \qquad S_i = A_i - t_c B_i$$

A_i is defined as the total dollar outlay of the ith district. The ith district refers to any one district in the state. The tax base for state taxes, B, is a simplified term referring to all the tax bases available to the state government for the raising of funds. These normally include income, sales, and other tax bases. B_i refers to this tax base in the ith district. The central tax rate, t_c, is another simplified term referring to the tax rates that are applied to these various tax bases. $t_c \sum B_i$ is the total amount of money raised and distributed by the state through the finance plan. N_i is an expression of units of need, such as number of pupils, average daily attendance, average daily membership, number of classroom units, number of teachers, and so forth. P_c is the centrally set service, or performance, level per unit of need. P_c may be defined in terms of dollars per unit of need, such as $120 per pupil. Or it may be defined in terms of services,

such as one teacher for each thirty children, permitting the dollar value to vary depending on the assignment of the teacher to a position on a state salary schedule.

Equation (1-1) defines the total amount of money spent by an individual district under this plan. As indicated, funds raised in excess of this amount are not considered at this point. The expenditures of an individual district, A_i, are equal to the product of the centrally set performance level, P_c, and the units of need, N_i, in that district. The true subsidy, S_i, is the difference between the expenditures of an individual district, A_i, and the amount of money raised by state taxes in that district ($t_c B_i$). The apparent subsidy--the amount of money a local district receives from the state under the finance plan--is equal to the algebraic sum of the true subsidy, S_i, and the amount of money raised by the state through the central tax applied to the tax bases available to the state in that district, $t_c B_i$. While the apparent subsidy is always positive or zero, the true subsidy may be positive, negative, or zero.

The central budget must be balanced so that

$$\sum S_i = 0 \qquad (1\text{-}3)$$

(All Summations are taken from i = 1 through i = n, where n equals the total number of districts in the state.)

POOR ORIGINAL COPY - BEST AVAILABLE AT TIME FILMED

The redistributional effects (true subsidies) of Plan 1 are shown below:

True Subsidy

Tax Base for State Taxes	Units of Need: $N_i < \bar{N}$	$N_i = \bar{N}$	$N_i > \bar{N}$
$B_i > \bar{B}$	-	-	+ or -
$B_i = \bar{B}$	-	0	+
$B_i < \bar{B}$	+ or -	+	+

However, this pattern of redistribution is not evident to the local districts. The only financial transaction which is readily apparent to them is the amount of money they receive from the state. What is not obvious to the local districts is the amount of money raised by state taxes in local districts. This money represents a drain on local district resources. The Basic Aid for Elementary School Districts Fund in California is an example of Plan 1 where every participating district receives funds (an apparent subsidy) from the state.

Plan 2 -- Equalization of Service Level Per Unit of Need Minus Local Contribution

This plan encompasses the Strayer - Haig Foundation program concept. The objective is to equalize the service, or performance, level per unit of need in all districts. Each district is required to raise a "local contribution" by applying a state mandated tax rate, t_s, to the tax base for local taxes. The state distributes sufficient funds (the apparent subsidy) so that, when added to the local contribution, each district is provided with an equal performance level per unit of need. Service levels are defined as in Plan 1: the same limitations apply.

The definitional equations for this plan are:

$$A_i = P_c N_i \tag{2-1}$$

$$S_i = P_c N_i - t_s C_i - t_c B_i \tag{2-2}$$

$$\sum S_i = 0 \tag{2-3}$$

where P_c, A_i, t_c, B_i, and S_i are defined as before. James[5] preferred to treat the required local tax levy, t_s, as a state tax. This state tax is collected locally, and can be treated in a manner similar to t_c, except that t_s is applied to the tax base on which the local district may levy taxes.

The state legislature usually sets the value of P_c and t_s. These are expressed as a dollar value for the foundation program and a minimum

---

5. H. Thomas James, Administrator's Notebook (Chicago: University of Chicago, Midwest Administrative Center, Vol. 7, No. 1, September, 1958),

required levey on the local tax base. When these two values are set, all other variables in the equations may be caculated. Summing (2-2), substituting (2-3), and solving for t_c permits calculation of the value of t_c to clear the state budget.

The effect on the true subsidy of changing either the performance level, P_c, or the state-mandated tax rate, t_s, is shown in the tables on page 11.

A rural district encompassing an agricultural community may have a high local tax base and a low state tax base (e.g., sales and income) per unit of need, while a district covering a central city with many retail stores may have a high state tax base and a relatively lower local tax base per unit of need. In this case, any shift in the proportion of the total funds raised (by changing either t_s or P_i) on the local tax base would shift the burden of school support from one district to another.

If the state-mandated local tax rate were increased without changing the minimum program level, then the burden of school support would be shifted toward the agricultural community. However, if the minimum program level were increased without changing the state-mandated tax rate on the local tax base, the rural citizens would pay a proportionately smaller share of these increased costs than the urban citizens would.

Plan 3 - Matching Grants

In Plans 1 and 2 service, or performance, levels are equalized to

Effect on True Subsidy of Increasing P_c Without Changing t_s

Tax Base for State Taxes per Unit of Need, $\frac{B_i}{N_i}$

Tax Base for Local Taxes per Unit of Need, $\frac{C_i}{N_i}$	$< \frac{\bar{B}}{\bar{N}}$	$= \frac{\bar{B}}{\bar{N}}$	$> \frac{\bar{B}}{\bar{N}}$
$> \frac{\bar{C}}{\bar{N}}$	+	0	-
$= \frac{\bar{C}}{\bar{N}}$	+	0	-
$< \frac{\bar{C}}{\bar{N}}$	+	0	-

Effect on True Subsidy of Increasing t_s Without Changing P_c

Tax Base for State Taxes per Unit of Need, $\frac{B_i}{N_i}$

Tax Base for Local Taxes per Unit of Need, $\frac{C_i}{N_i}$	$< \frac{\bar{B}}{\bar{N}}$	$= \frac{\bar{B}}{\bar{N}}$	$> \frac{\bar{B}}{\bar{N}}$
$> \frac{\bar{C}}{\bar{N}}$	-	-	- or +
$= \frac{\bar{C}}{\bar{N}}$	-	0	+
$< \frac{\bar{C}}{\bar{N}}$	- or +	+	+

some centrally set level. Local districts have no direct control over the level of service to which all districts are equalized. Plan 3 provides autonomy for local districts to determine their own performance levels of service. However, in contrast to Plans 1 and 2, where the primary effect is equalization, Plan 3 has the primary effect of providing an incentive, through matching funds from state taxes, for individual local districts to raise tax and service levels. No provision is made for equalizing service levels of different districts.

In this plan the state matches all district revenues at a uniform rate. Each individual district establishes its own expenditure level. The definitional equations for this plan are:

$$A_i = t_i C_i + k t_i C_i \tag{3-1}$$

$$S_i = k t_i C_i - t_c B_i \tag{3-2}$$

$$\sum S_i = 0 \tag{3-3}$$

The value of the matching index, k, is commonly set by the state. If $k = 1$, then the matching rate will be one dollar of funds raised by state taxes for each dollar raised by local taxes. The apparent subsidy is equal to the matching index times the amount of money raised by local taxes, or $k(t_i C_i)$. The true subsidy, S_i, is equal to the difference between the matching grant and the money raised by the state tax, t_c, applied to the tax base for state taxes, B_i, of that district. The true subsidy is expressed in (3-2).

The level of central tax, t_c, necessary to clear the budget is determined by summing (3-2) and solving for t_c.

(3-2) $$S_i = kt_iC_i - t_cB_i$$

$$\sum S_i = \sum kt_iC_i - \sum t_cB_i$$

since from (3-3)

$$\sum S_i = 0$$

$$0 = \sum kt_iC_i - \sum t_cB_i$$

(3-4) $$t_c = \frac{k\sum t_iC_i}{\sum B_i}$$

If local districts set their local tax levels directly, then these can be substituted into (3-4) and t_c can be determined. A more common procedure is for the local district to set the desired level of expenditures. It is then necessary for the district to calculate the local tax rate, t_i, so that local taxes plus matching funds from the state provides sufficient funds to support the desired program. An equation for calculating the necessary local tax rate may be developed by solving (3-1) for t_i.

Plan 3 offers incentives for local districts to raise taxes. It also provides a redistribution of funds, raised in local districts by state levied taxes, between districts. However, the effect is not equalization of either outlay or ability to raise funds. Rather, a district with a high tax base for local taxes has a distinct advantage, since it can raise local funds with much less effort than a district with a low tax base for local taxes. This advantage is compounded, since funds raised locally are matched by funds from the state treasury.

Plan 4, like Plan 3, permits each district to set its own level of expenditures. However, instead of providing matching grants at a uniform rate statewide, it equalizes potential, or ability to raise taxes locally.

Plan 4 -- Equalization of Fiscal Capacity per Unit of Need

The first two plans equalize outlays to some level determined by the state government. The philosophy underlying these plans is that it is the responsibility of the state to see that each district provides a minimum level of service. A different philosophy holds that each district should have the freedom to set its own level of service. This is accomplished in Plan 3, where the state provides matching grants as incentives for local districts to raise their levels of expenditures. However, Plan 3 makes no provision for equalization of differences in abilities of local districts to raise funds from the tax base for local taxes.

Plan 4 provides both equalization and autonomy, equalizing potential or capacity to raise local revenues, while permitting each district to determine the level of service it provides. In contrast to Plans 1 and 2 which equalize services to some minimum level, Plan 4 equalizes the ability of different districts to provide services.

This is accomplished in the following manner:

a. The state sets a level to which potential, or ability to raise funds on the tax base for local taxes, will be equalized. This is commonly expressed as a "guaranteed" local tax base per unit of need.

b. Each district sets its desired level of total expenditures.

c. Using the guaranteed tax base and the units of need within the district, a tax rate is calculated necessary to raise funds to cover the desired level of expenditures.

d. This calculated tax rate is applied to the tax base for local taxes to determine the amount of funds raised by local taxes.

e. The state provides an apparent subsidy equal to the desired level of expenditures less the funds raised by local taxes (b - d). The funds for this apparent subsidy come from statewide taxes.

f. The true subsidy in a given district is the apparent subsidy minus the amount of money raised by state taxes in that local district.

For the purpose of this discussion, it will be assumed that the guaranteed tax base times the units of need in an individual district

is equal to or greater than the total tax base for local taxes in that district so that:

$$(N_i C_s - C_i)t_i \geq 0$$

This assumption excludes the possibility of some districts being required to give the state a portion of the funds raised on the tax base for local taxes. In actual practice, districts, where the guaranteed tax base times the units of need is less than the total tax base for local taxes (i.e., a "rich" district), are excluded from participating in the plan.

The definitional equations for this plan are:

(4-1) $$A_i = N_i C_s t_i$$

(4-2) $$S_i = (N_i C_s - C_i)t_i - t_c B_i$$

(4-3) $$\sum S_i = 0$$

A_i, t_c, t_i, C_i, B_i, S_i, and N_i are defined as in the previous plans. The guaranteed local tax base, C_s, is expressed in dollars per unit of need, N_i.

Solving (4-1) for t_i yields a formula for calculating the local tax rate in the ith district.

(4-4) $$t_i = \frac{A_i}{C_s N_i}$$

From one standpoint, the incentive effects of Plan 4 should be greatest for a district with a low local tax base per unit of need. This district would receive a larger subsidy per unit of need than a district with a high local tax base per unit of need. However, it may be more difficult for the low local tax base district to raise local taxes because of limited resources within the district.

Ultimately, it is hoped that the method of inquiry presented in this paper will have both heuristic and practical value. By examining the tax bases utilized by the state for raising funds, it is possible to analyze the tax burden borne by various individuals. In this context, it is important to note that taxes are paid by people. Inanimate objects such as business, tobacco, or corporations do not pay taxes. A tax collected on any inanimate object is ultimately paid by individuals. These are the same individuals who are called upon to pay property taxes, either through ownership or as part of rental charges. Therefore, the various state taxes and the local property tax both derive funds from the same source, individuals who live in local school districts.

There are many other areas which could be explored using the framework which forms the basis for this paper. Practically, the analysis presented in this paper may be of assistance in considerations of modifications of existing finance plans. The modifications of school support plans should be made on considerations of the long term effects of changes, based on a clear analysis as to the effects of the changes, rather than expedients, if optimum benefit is to be derived from the tax dollar and if the state objectives are to be met. It is hoped this paper will add to the realization of these goals.